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ABSTRACT

This study explored the relationships among age, gender, depth of sport experience, and coincidence anticipation performance for 42 children 3- to 9-year-old from high middle and socioeconomic backgrounds. The task involved observing light illumination moving down the track of a Bassin Timer. Depth of sport experience was evaluated by the amount of involvement in competitive sports. Results indicated that there are gender differences: (1) in when children begin to have greater depth of experience in sport; (2) in the pattern of the quality of coincidence anticipation performance; and (3) in the pattern of consistency of coincidence anticipation performance. The patterns suggest that involvement in, and depth of, sport experience related to coincidence anticipation performance quality and consistency, and that depth of sport involvement early in the 6- to 9-year age ranges seems to be important. (JD)

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# PATTERN OF RELATIONSHIPS OF COINCIDENCE ANTICIPATION WITH AGE, GENDER, AND DEPTH OF SPORT EXPERIENCE

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## ABSTRACT

The purpose of this study was to describe the relationships among age, gender, depth of sport experience, and coincidence anticipation performance for 4 to 9 year old children from high middle and high socioeconomic background? Subjects were 42 children (26 males and 16 females) who were participants in an organized day camp in a private community center. Each family completed a questionnaire regarding demographic variables about the child and family. Each child performed 36 trials of the Bassin Timer Task (four sections of track) with control for equal numbers of and random assignment of: (a) lights approaching from the left and right sides, and (b) speeds of 3, 4, and 5 mph. Both quality of performance (constant error, CE) and consistency of performance (variable error, VE) were calculated for the block of 36 trials of coincidence anticipation. Depth of sport experience was evaluated by the involvement in organized competitive sport, primarily soccer, tennis, baseball, and some swimming. Analysis of the data indicated there were definite patterns across age, gender, and depth of sport experience on a coincidence anticipation task for 4-9 year old children from high middle and high socioeconomic families. The majority ($\cong$ 75%) of the 4-5 year old males and females had no competitive sport experience, but the pattern of involvement changed after that. Only 42% of the female 6-7 year olds had competitive sport experience, while 83% of the males were already involved. By

age 8-9 years, approximately 80% of both genders were involved in competitive sports. For quality of performance (CE) there was a gender distinction for 4-5 year olds with males having a plateau in CE, and females having no regularly definable pattern. From ages 6-9, there was a steady improvement in quality of performance (CE). The within group variability of CE was greater for females than males throughout the 6-9 year range. There was definite steady improvement in the consistency of coincidence anticipation performance (VE) for females and males ages 4, 5, and 6. By age 6 the consistency (VE) for the males reached a plateau which held fairly constant across 6-9 year age groups, while the females in these age groups showed no regular pattern of consistency. In addition, males with experience in competitive sport had significantly better quality (CE) and consistency (VE) of coincidence anticipation experience than did: (a) males with no competitive sport experience, and (b) females with competitive sport experience. In conclusion, the results suggest for 4-9 year old children with high middle and high socioeconomic background, there are gender differences: (a) in when children begin to have greater depth of experience in sport, (b) in the pattern of the quality of coincidence anticipation performance, and (c) in the pattern of the consistency of coincidence anticipation performance. Thus, the patterns suggest that involvement in, with depth of, sport experience relates to coincidence anticipation performance quality and consistency, and that depth of sport involvement early in the 6-9 year range seems to be important.

# INTRODUCTION

A strong relationship seems to exist between the chronological age of an individual and the development of timing which is involved in coincidence-anticipation. Significant increases in performance as age increased were reported by numerous researchers (Bard, Fleury, Carrier, & Bellec, 1981; Dorfman, 1977; Dunham, 1977; Haywood, 1980; and Stadulis, 1971). The research regarding the gender variable has produced conflicting results. Differences among gender for children were reported by several researchers (Bard et al., 1981; Dorfman, 1977; Dunham, 1977), while the findings of other researchers (Haywood, 1980; Pavlis, 1972; Stadulis, 1971; Wrisberg and Mead, 1981, 1983) indicated no differences between males and females.

The confusion that exits about gender differences in regard to coincidence anticipation tasks is wide spread. Researchers doing supposedly similar studies, analyzing coincidence anticipation ability, report conflicting results (Haywood, 1980; Stadulis, 1971; Thomas, et al., 1981; Wrisberg & Mead, 1981, 1983). Various explanations have been offered for these findings, e.g., task complexity differences, variations in viewing time, differences in previous experiences due to socialization, and other procedural distinctions. For example, Pavlis (1980) suggested that the uniqueness of the task and the lack of male prior practice led to his findings of no difference. Schmidt (1968) stated that because of the

importance of background experiences in this area, males have superior performance to that of females. Males have more opportunities to interact with moving objects in the sport setting than do females, and therefore, will have a more highly developed receptor anticipation ability. Bard et al. (1981) supported this idea with their results that males performed better than females only when the complexity of the task increased to the point where the male had more prior experience. These explanations tend to suggest that experience is the major contributing factor to the development of coincidence-anticipation ability.

The studies of coincidence anticipation that reported no gender differences for children are in agreement with the developmental model proposed by Maccoby and Jacklin (1974). But, since contrasting results related to this perspective have been reported (Berlin & Languis, 1980; Roberts, 1972), the validity of the model, and/or the application of the model to coincidence anticipation as previously measured, remains uncertain. Thus, more research must be conducted to clarify the factors relating to and/or effecting the gender differences in: (a) coincidence-anticipation and/or (b) the processing of visuospatial information.

## PURPOSE OF THE STUDY

The purpose of this study was to describe for middle to high socioeconomic level children ages 3-9 the relationship among: (a) gender, (b) age, (c) previous experience in competitive sport, and (d) coincidence anticipation.

## PROCEDURES

Subjects for the study were forty-two 3-9 year old children: (a) who were enrolled in the day camp at a local community center, (b) who were informed of the purpose and gave their consent, and (c) whose parents were informed of the purpose of the project and gave their consent for their child to participate. Parents completed a questionnaire regarding the age of the child and the competitive experience. Families of the children in the study were all in high middle or high socioeconomic income categories.

All data were collected within a five week time period at the local community center. All data were collected on a carefully scheduled basis by an experienced administrator.

The coincidence anticipation task involved observing light illumination moving down the track of a Bassin Timer of LaFayette Instrument Co. The subject was told to press the hand held button with their preferred thumb when they believed the last light on the track would illuminate. Each subject performed a total of 36 trials without feedback with control for, equal numbers of, and random assignment of: (a) light approaching from left and right sides; and (b) speeds of 3, 4, and 5 mph. Coincidence anticipation ability (CE) and consistency (VE) were calculated across trials for all subjects.

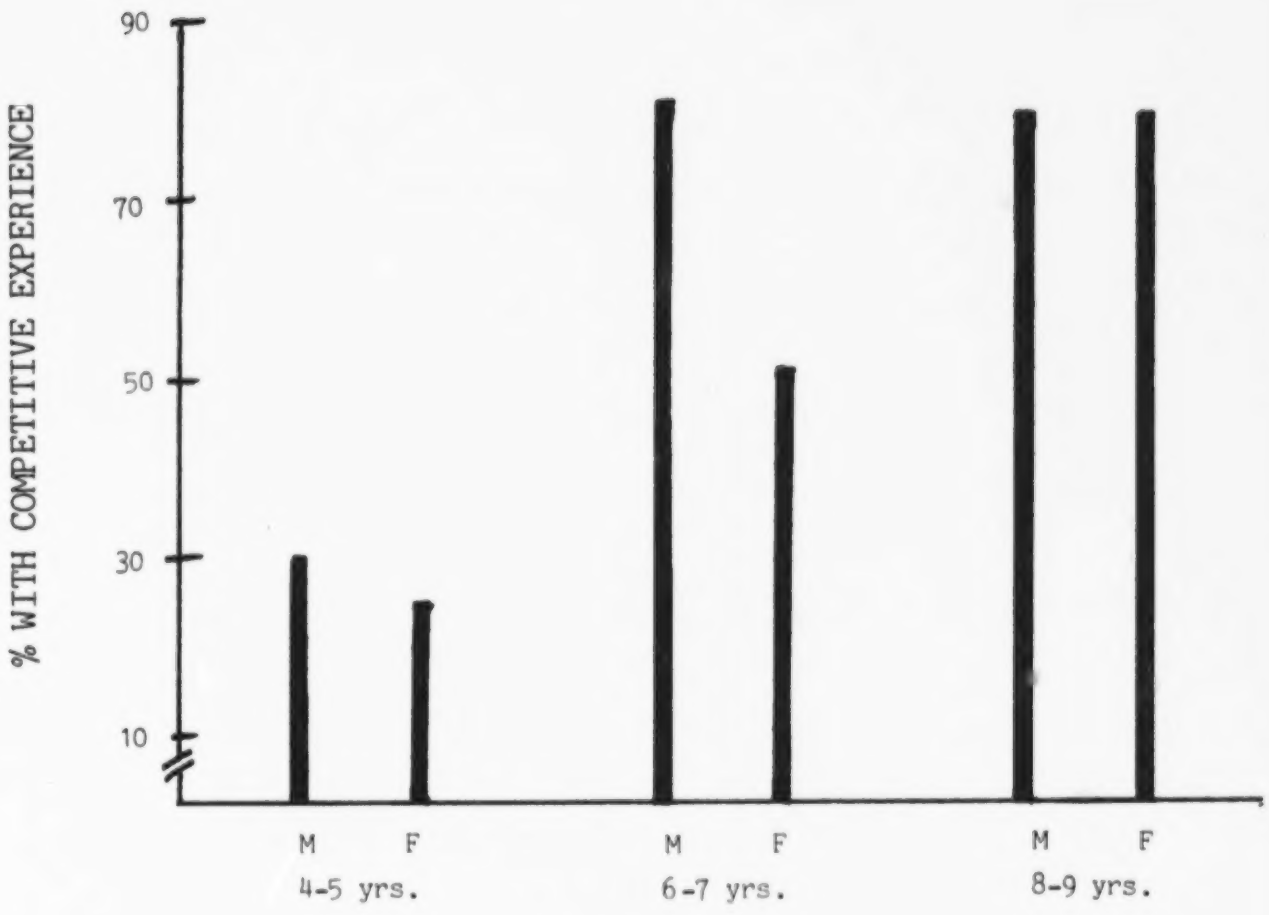
## RESULTS

1. For children with parents in the high and high middle socioeconomic level:

   a. = 30% of the male 4-5 year olds had competitive experience
   b. = 25% of the female 4-5 year olds had competitive experience
   c. = 83% of the male 6-7 year olds had competitive experience
   d. = 42% of the female 6-7 year olds had competitive experience
   e. = 80% of the male 8-9 year olds had competitive experience
   f. = 80% of the female 8-9 year olds had competitive experience

These gender * age * experience results suggest that both genders have approximately the same competitive experiences until about age 6, at which time most of the males and only some of the females begin to have in-depth sport experiences. By age 8 most of both genders in these socioeconomic levels are experiencing in-depth sport experiences. However, at least half of the females have started this in-depth experience at least two years later than at least half of the males. In other words, by age 9, almost all boys have had a minimum of 3-4 years of in-depth sport experience, while almost all girls have had only 1-2 years of in-depth sport experience.

# GENDER x AGE x EXPERIENCE

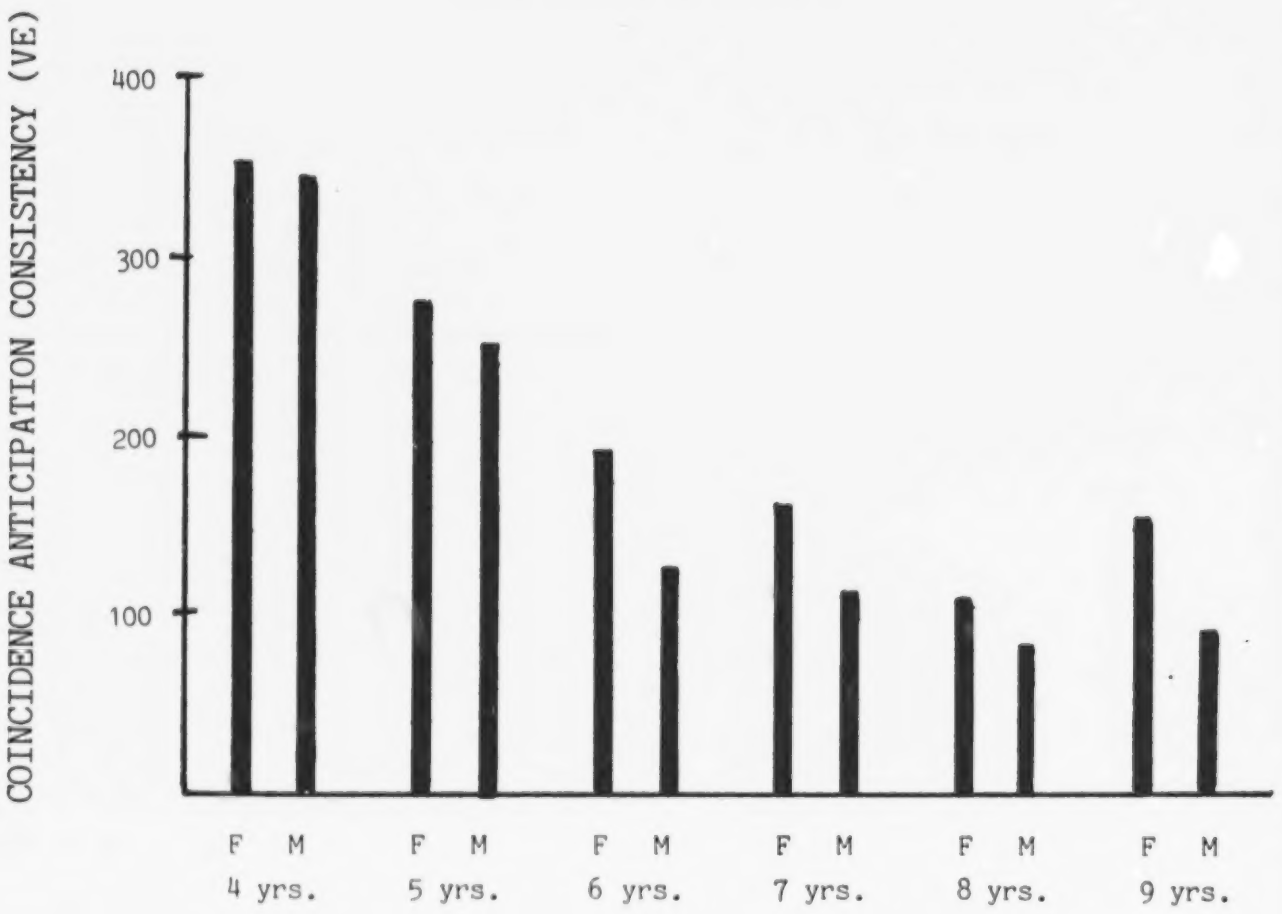



M = MALES

F = FEMALES

2. There was a significant gender * age interaction for coincidence anticipation consistency (VE) (Kruskal-Wallis, p =.0001). The age group differences were large for males aged 4-6, followed by minimal differences among the 7-9 age groups, thus suggesting a plateau. The age group differences for females were fairly consistent (from year to year) from 4-8 years; no plateaus were evident; however, the 9 year old females were less consistent than the 8 year olds. A regression analysis of age with VE for each gender supported the above trend analysis with: (a) the males having a steeper slope than the females; (b) the intersection of the plotted male and female linear equations; and (c) both male and female regression analyses accounted for approximately the same moderate amount of common variability between age and VE ($r^2$=.45 and $r^2$=.48 respectively).

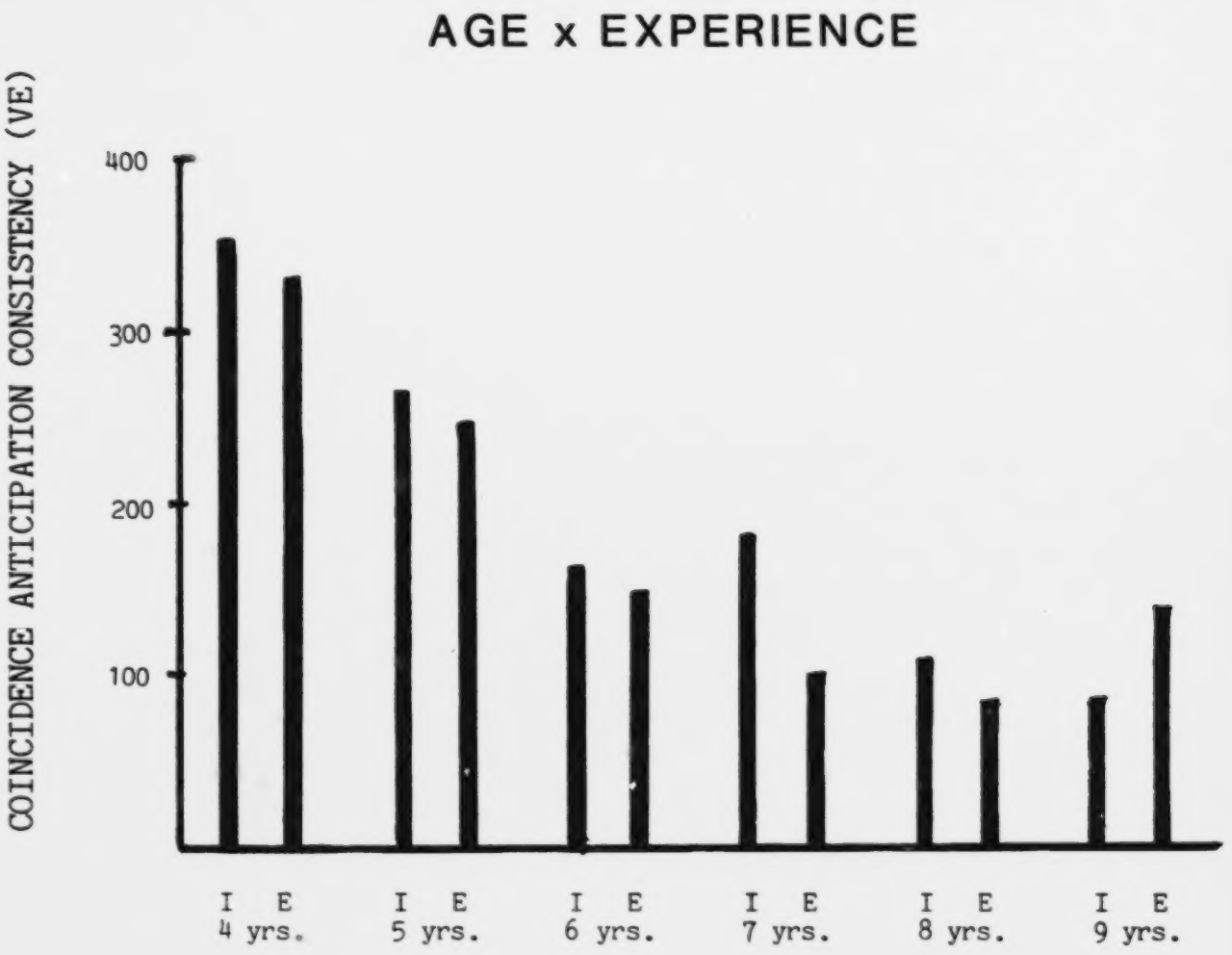
## GENDER x AGE




F = FEMALES

M = MALES

3. There was a significant interaction of age with competitive experience for consistency (VE) of coincidence anticipation (Kruskal-Wallis, p=.0007). The trend across age groups for the non-experienced children shows a reasonably steady decline in VE as age increases. The pattern across age groups for the children with competitive experience indicates a steady decline in VE across the 4-6 ages, a slowing in the trend from 6-8 (almost a leveling), and then an upward swing at 9 years of age. The follow-up regression analyses support these pattern results: (a) for the non-experienced a strong regression ($r^2$=.62, p=.0002) indicating a steady downward trend of VE as age increases; (b) for the experienced a weak but significant linear pattern ($r^2$=.21, p=.0197) indicating the nature of the pattern may be more curvilinear at the upper ages.

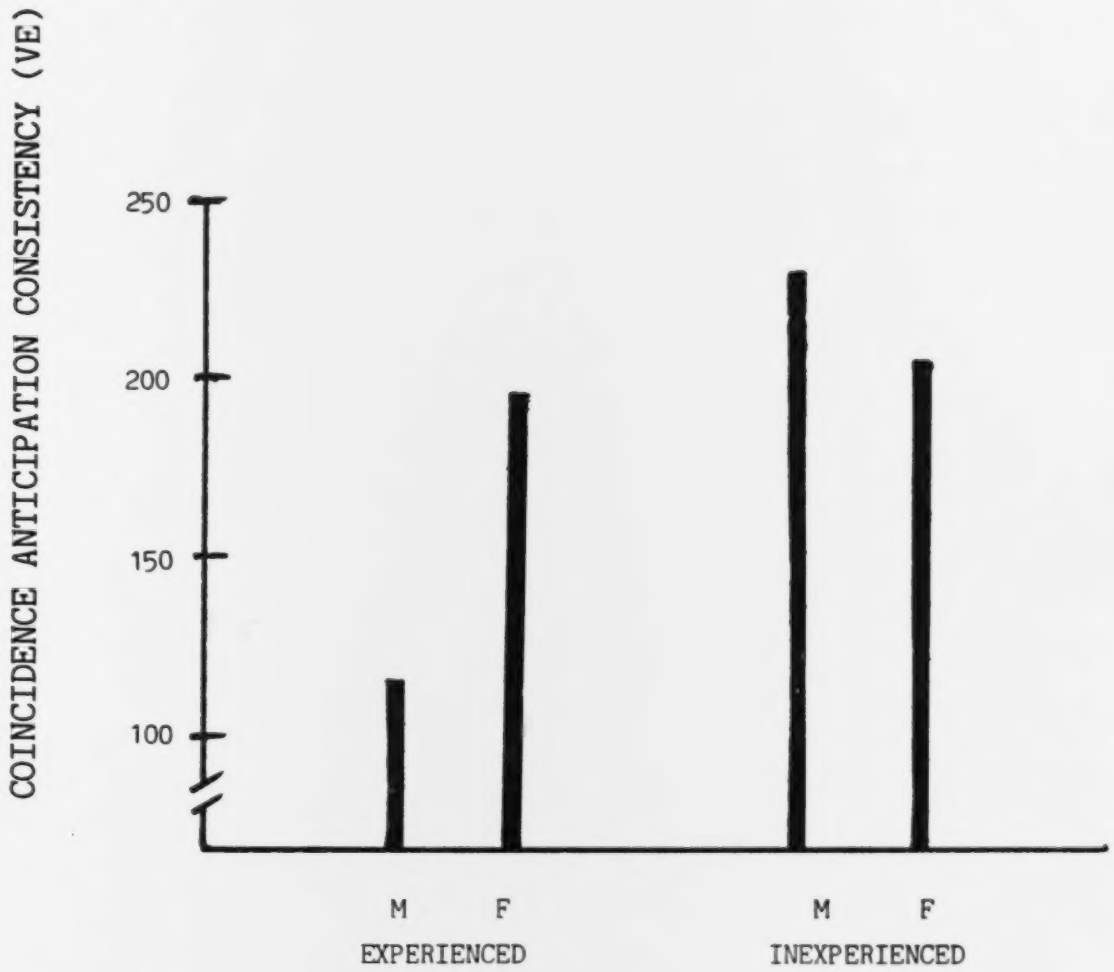



I = INEXPERIENCED

E = EXPERIENCED

4. There was a significant gender * experience interaction for consistency of coincidence anticipation (VE) (Kruskal-Wallis, p = .12). Males with experience in competitive sports had better coincidence anticipation consistency (VE) than: (a) males with no experience in competitive sport, and (b) all females.

# GENDER x EXPERIENCE



## CONCLUSIONS

In the 4-9 year old range in high-middle and high socioeconomic level:

1. Boys have in-depth sport experiences 3-4 years earlier than girls.
2. Both genders have attainment of coincidence anticipation consistency within 1-2 years after starting in-depth sport experience.
3. For coincidence anticipation consistency, there is: (a) an age * experience interaction, (b) a gender * experience interaction, and (c) a gender * age interaction.
4. Participation in in-depth sport experiences may enhance the development of coincidence anticipation consistency.
5. There is a need for longitudinal studies to determine the degree of relationship of coincidence anticipation ability and consistency for both genders with the initiation of and degree of in-depth sport experience.
6. There is a need to determine what factors affect coincidence anticipation ability and why almost all children respond late.

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| | SUBJECTS | TASK - ENVIRONMENTAL CONSIDERATIONS | | | | | TASK - MOVEMENT/PERFORM CONSIDERATIONS | RESULTS | | |
|---|---|---|---|---|---|---|---|---|---|---|
| STUDY | AGES | Type Motion R = Real A = Apparent | Stimulus | Speed C = Constant AD = Accel/Decel | Runway Length | Movement Req. to Respond | | Age Difference | Gender Difference | Age & Gender Interaction |
| Stadulis (1971) | 7,9,11 | Real | Ball | Accelerated | 6 ft. | Release Key | Preferred Hand | CE & VE Improve With age | No | No |
| Dunham (1977 | 7-12 | Real | Ball | Accelerated | 15 ft. | Release Pedal | Foot | CE & VE Improve With age | M more accurate & less VE than F | No |
| Dorfman (1977) | 6-7 12-13 8-9 14-15 10-11 18-19 | Apparent | Oscillascape dot | Constant | | Move Slide | Preferred Hand | Improve With age | M more accurate & less var. than F | |
| Haywood (1980) | 7-9 18-32 11-13 60-72 | Apparent | Simulated Light | Constant | 5 ft. (2-5 mph) | Depress Button | Preferred Hand | Improve With age | No | No |
| Bard ET AL (1981) | 6-11 | Real | Ball Moving target | Acceleration/ Deceleration | 6 ft. | Throw at Moving Target | Preferred Hand | Improve With age | M less var. than F | F impr with practice in complex tasks |
| Wrisberg & Mead (1981) | 6-7 | Apparent | Simulated Light | Constant | 9.5 ft. | Hit Barrier | Preferred Hand/Arm | NA | No | NA |
| Thomas, ET AL (1981) | 7-20 | Apparent | Simulated Light | Constant | 447 cm/sec | Depress Button | Preferred Forefinger | 9-11 Major Impr | No | No |
| Wrisberg & Mead (1983) | 6-7 | Apparent | Simulated Light | Constant | 9.5 ft. | Hit Barrier | Preferred Hand/Arm | NA | No | NA |